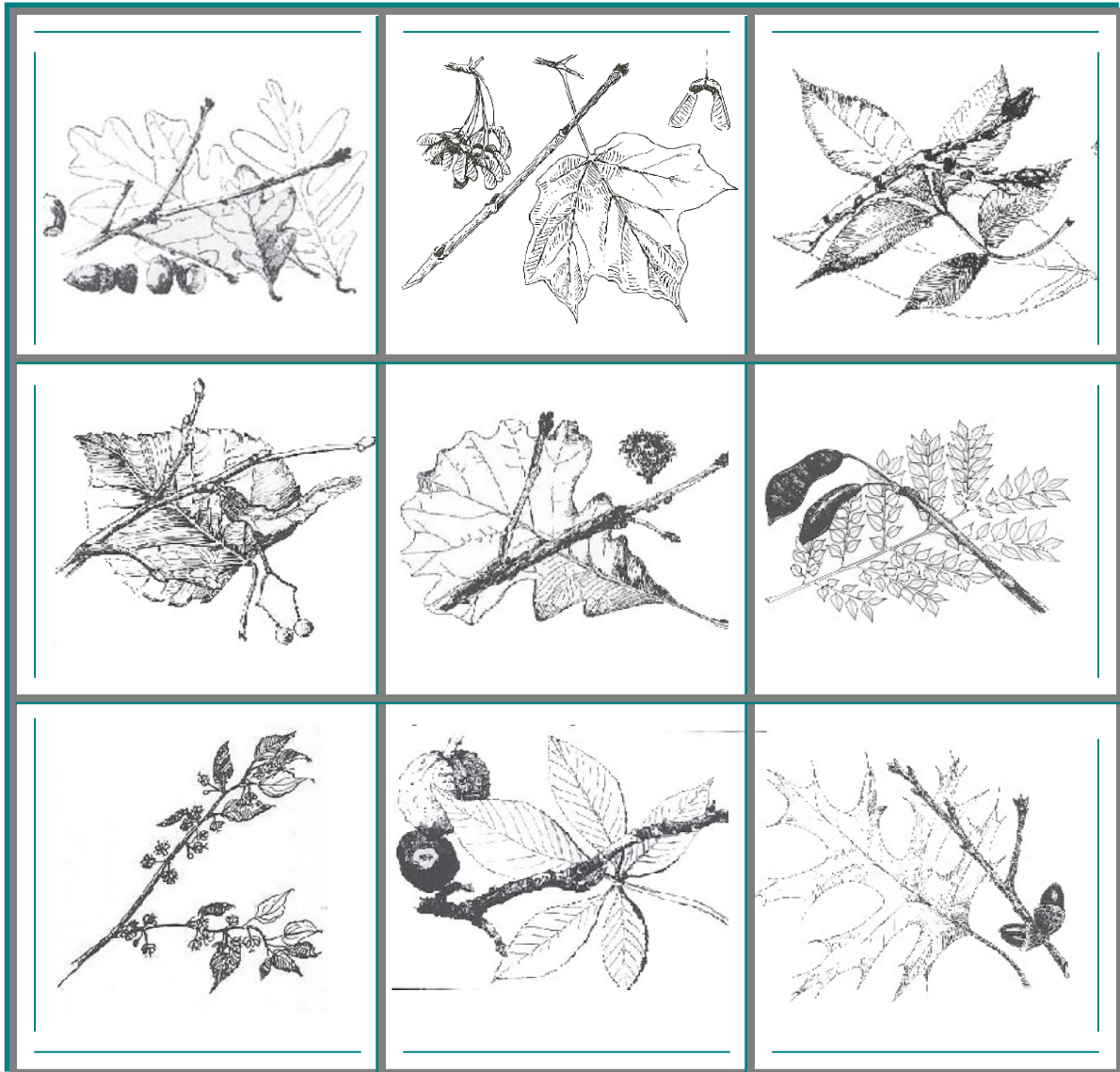


Trees for Teens

Ecological Diversity



2009-2010 School Year

Table of Contents

Introduction.....	2
Lesson 1: Biodiversity Loss and Our Ecological footprint.....	3
Extra Activity.....	5
Lesson 2: Nature Walk: Identifying Tree Species.....	6
Extra Activity.....	8
Lesson 3: Threatened and Endangered Species Habitats.....	9
Extra Activity.....	12
Lesson 4: Invasive Travelers to Iowa.....	13
Extra Activity.....	15
Reading Rangers.....	16
Resources.....	17
Answer Keys.....	18

**A special thank you to all
the Trees for Kids / Teens
Partners for 2009!**



Trees for Kids 2009-2010 – Iowa DNR

Trees for Teens 2009-2010

The Program

Trees For Kids / Teens is an educational program that involves learning about and planting trees, with a focus on Iowa's elementary and secondary school students. Its goals are to educate students about the values of trees and to encourage tree planting projects at schools or other public areas around the state of Iowa.

This unique program is sponsored by the Iowa Department of Natural Resources – Bureau of Forestry, MidAmerican Energy, Black Hills Energy, Alliant Energy, Trees Forever, Iowa Tree Farm Committee, Iowa Woodland Owners Association, Iowa Bankers Association, and Iowa Landscape and Nursery Association.

The educational materials include tree/forestry lesson plans and classroom activities which are designed to meet the educational standards and benchmarks for Iowa and at the national level. These lessons compliment science, reading, math, geography, computer skills, history, and other subjects. Feel free to utilize any or all of the materials and to print/photocopy specific activities. If you would like a hard copy, please contact the Iowa DNR Trees for Kids Coordinator at 515/281-6749 or visit the TFK / TFT webpage at:

www.iowadnr.gov/forestry/treesforkids.

The Trees

Trees for Kids / Teens offers opportunities to have demonstration tree plantings at your school every spring and fall through a grant process. Schools are selected based on their grant application, with over 16 projects funded a year. Please visit the Tree for Kids website www.iowadnr.gov/forestry/treesforkids for an application. If you have questions about the application process or the program contact your local District Forester or the Trees for Kids Coordinator at (515)281-6749.

Materials, Layout and Design
Emma Bruemmer, Iowa DNR
TFK / TFT Coordinator
502 E. 9th
Des Moines, IA 50319
515 / 281-6749



Bureau of Forestry

Lesson 1: Biodiversity Loss and Our Ecological Footprint

Goal: Students will

- 1) Understand the words diversity and biodiversity
- 2) Learn their ecological footprint
- 3) Be able to draw food chains with and without human influence
- 4) Discover ways to reduce their ecological foot print and their impact on loss of biodiversity

Objective:

Practice working in groups
Practice inputting data onto a computer calculation system
Practice drawing food chain systems

Benchmarks:

Iowa Benchmarks Science, 6 – 9: Students can analyze and interpret scientific information. Students can understand concepts and relationships in life science. Students can understand life cycles. Students can understand environmental interaction and adaptation.

National Science Standards, 6 – 8: The cycles continue indefinitely because organisms are decomposed after death to return food materials to the environment. In all environments, organisms with similar needs may compete with one another for limited resources, including food, space, water, air, and shelter. All organisms, both land-based and aquatic, are interconnected by their need for food. This network of interconnections is referred to as a food web. The entire earth can be considered a single global food web and food webs also can be described for a particular environment. At the base of any food web are organisms that make their own food, followed by the animals that eat them, then the animals that eat those animals, and so forth.

Materials:

- Computer lab –optional
- Paper and Pencil
- Poster paper or self-stick easel paper
- Markers

Lesson:

Ask: What is biodiversity? Why is diversity of species, ecosystems and regions important? How do we impact biodiversity?

Do:

1) Have a group discussion on habitat. Discuss what kinds of habitats you have in your community, in Iowa, in the USA and in the world. Ask students why having a large number of plants and animals is important, making sure they touch the small and large scale systems.

2) Ask student if they have heard of an Ecological Footprint? Have students find out their Ecological Footprint by visiting

http://www.footprintnetwork.org/en/index.php/GFN/page/personal_footprint

/ Students may need some help answering a few questions, such as how much average electric bills are for your area. Have them write down their final report including how many acres of each category they are using. If you do not have access to computers you can do an example and share the answers you put into the calculator and the results.

Reflect:

Ask students if they were surprised by the amount of earths they would need to live, given everyone lives like them? How does your ecological footprint relate to biodiversity? What are ways to decrease biodiversity loss?

Apply:

Put students in groups of 3 or 4. On large poster board or self-stick easel paper have groups draw out a food chain. They should exclude humans and have something in each of the following categories, primary producers, herbivores, omnivores, carnivores and decomposers. If you have not discussed what these categories are before you might want to introduce them, by including them in their daily notes. Have them draw the lines between the parts of the food chain. Explain that because of our population growth and the Ecological Footprint state our need for more than one Earth (most students will be near 4 Earths) humans have entered the food chain. Looking at their Ecological Footprints, have the groups decide where they would impact the food chain the most. This might be by eating one of the animals, taking over an acre of forest land, putting in crop land in the area that provides food or shelter. Have each group share their food chain and how the humans have or have not affected the food chain. Finally, ask students how their actions impact loss of biodiversity.

Extra Activity:

Word Scramble

oonrmsive	-----
soevbitridyi	-----
ecgoclalio oofrnpitt	-----
rrapimy oecrpruds	-----
eivorrbshe	-----
oofd ainch	-----
yetdvsrii	-----
ecroesopsmd	-----
ledimit srrseueoc	-----
invroresca	-----
ieennecnrttodc	-----

Make you own word scramble at <http://www.armoredpenguin.com/wordscramble/>

Lesson 2: Nature Walk: Identifying Tree Species

Goal: Students will

- 1) Learn the words taxonomy and dendrology
- 2) Understand the taxonomical ranking and nomenclature of organisms
- 3) Be able to identify and categorize trees

Objective:

Practice collecting samples for scientific inquiry
Practice organizing categorizing different trees species
Practice using field guides or online keys

Benchmarks:

Iowa Benchmarks Science, 6 – 9: Students can analyze and interpret scientific information. Students can understand concepts and relationships in life science.

National Science Standards 6 – 8: In classifying organisms, scientists consider details of both internal and external structures. Similarities among organisms are found in internal anatomical features, which can be used to infer the degree of relatedness among organisms.

Materials:

- Leaves, fruit or flowers collected on field trip 5 per student
- Notebook and pencil
- Taxonomic ranking tree
- Computer lab or field guides

Lesson:

Ask: Do you know how to classify and name trees?

Do:

1) Ask students if they have heard of the word dendrology? If not explain that it is the study of woody plants and their taxonomy. What is taxonomy? Explain that taxonomy is how we classify organisms. This would be a good time to introduce a taxonomic ranking tree, with Kingdom, Phylum, Class, Order, Family, Genus, and Species. Ways to remember the order are "Kings play chess on fluffy green sofas" or "King Philip came over from great Spain". Explain that today they will be dendrologists and will be finding the taxonomy of trees around their school or community. Clarify that most dendrologist just refer to the last two descriptors, genus and species, when referring to the identification of a tree. These last two categories of naming are in Latin, but often we refer to them by a common name. What we refer to as bur oak has a genus and species name in Latin of *Quercus macrocarpa*. Some scientists

refer to this as the species epithet, because of the many cultivars humans have created.

2) Ask student what parts of a tree they can use to help them identify a tree for naming. Making sure they include leaf, bark, fruit/seeds/cones, twigs, buds, and flowers.

3) Students will go on nature hike around the school or park to look at different trees and collect samples of their leaves. Each student should collect at least 5 leaves, fruits, seeds, cones, or flowers that they need to identify trees. Remind them that they want to be cautious not to damage the trees, so they may want to take note of what the bark, buds and twigs look like.

Reflect:

Ask, students now that they have their sample how will they know the specific genus and species? Ask students if they have ever heard of an identification key.

Apply:

Have students use field guides to identify their trees, labeling them in both Latin and their common name. If you do not have field guides available some recommended websites for identification are:

<http://www.oplin.lib.oh.us/tree/> or

<http://www.cnr.vt.edu/dendro/forsite/key/intro.htm>

Extra Activity:

20 Native Trees of Iowa



American Hornbeam

Black Maple

Bur Oak

Chinkapin Oak

Cockspur Hawthorn

Downy Serviceberry

Hackberry

Hophornbeam

Kentucky Coffeetree

Linden

Nannyberry

Northern Pin Oak

Ohio Buckeye

Pagoda Dogwood

Red Oak

Shagbark Hickory

Shingle Oak

Swamp White Oak

White Oak

Witchhazel

make your own wordsearch at <http://www.armoredpenguin.com/wordsearch/>

Trees for Kids 2009-2010 – Iowa DNR

Lesson 3: Threatened and Endangered Species Habitats

Goals: Students will

- 1) Learn what threatened and endangered species are located in parts of Iowa
- 2) Know the reasons for threatened and endangered species
- 3) Learn how knowledge of these species occurs through scientific surveys

Objectives:

Practice using the internet to answer unknowns
Critical thinking about how we collect data and apply those to environmental policies

Benchmarks:

Iowa Benchmarks Science, 6 – 9: Students can analyze and interpret scientific information. Students can understand concepts and relationships in life science. Students can understand environmental interaction and adaptation.

National Science Standards, 6 – 8: In all environments, organisms with similar needs may compete with one another for limited resources, including food, space, water, air, and shelter. The world contains a wide diversity of physical conditions, which creates a wide variety of environments: freshwater, marine, forest, desert, grassland, mountain, and others. In any particular environment, the growth and survival of organisms depend on the physical conditions. Given adequate resources and an absence of disease or predators, populations of organisms in ecosystems increase at rapid rates. Finite resources and other factors limit their growth.

Materials:

- Pencil and paper
- Computer lab or print offs of current county data

Lesson:

Ask: Do we have a diverse amount of species of both plants and animals where we live? Did we have more in another time period? Do we have threatened and endangered species in Iowa?

Do:

- 1) Have students go to the website <https://programs.iowadnr.gov/naturalareasinventory/> . When they get to

the website have them click on the public version. Student should select their county for a listing of threatened and endangered species found there at the bottom of the page.

2) After viewing the listings assign students plants and animals. Students should find the habitat in which their species are located and the reasons they are threatened or endangered. For younger students choose plants and animals with a PDF, it will guide them to the correct answers. For a harder challenge select plants and animals without a PDF, and direct students to find answers via additional internet research. Have them look at what other counties these animals are threatened or endangered in by entering the name of the animal in the state wide list at the top of the page.

3) Have students share their findings on their assigned plant or animal with the rest of the class.

4) Have students look up the number of threatened and endangered species in Ida, Harrison and Allamakee counties.

*note if a computer lab is not available you can print off copies of the threatened and endanger species PDF in your county and the number of threatened and endangered species in the other 3 counties.

Reflect:

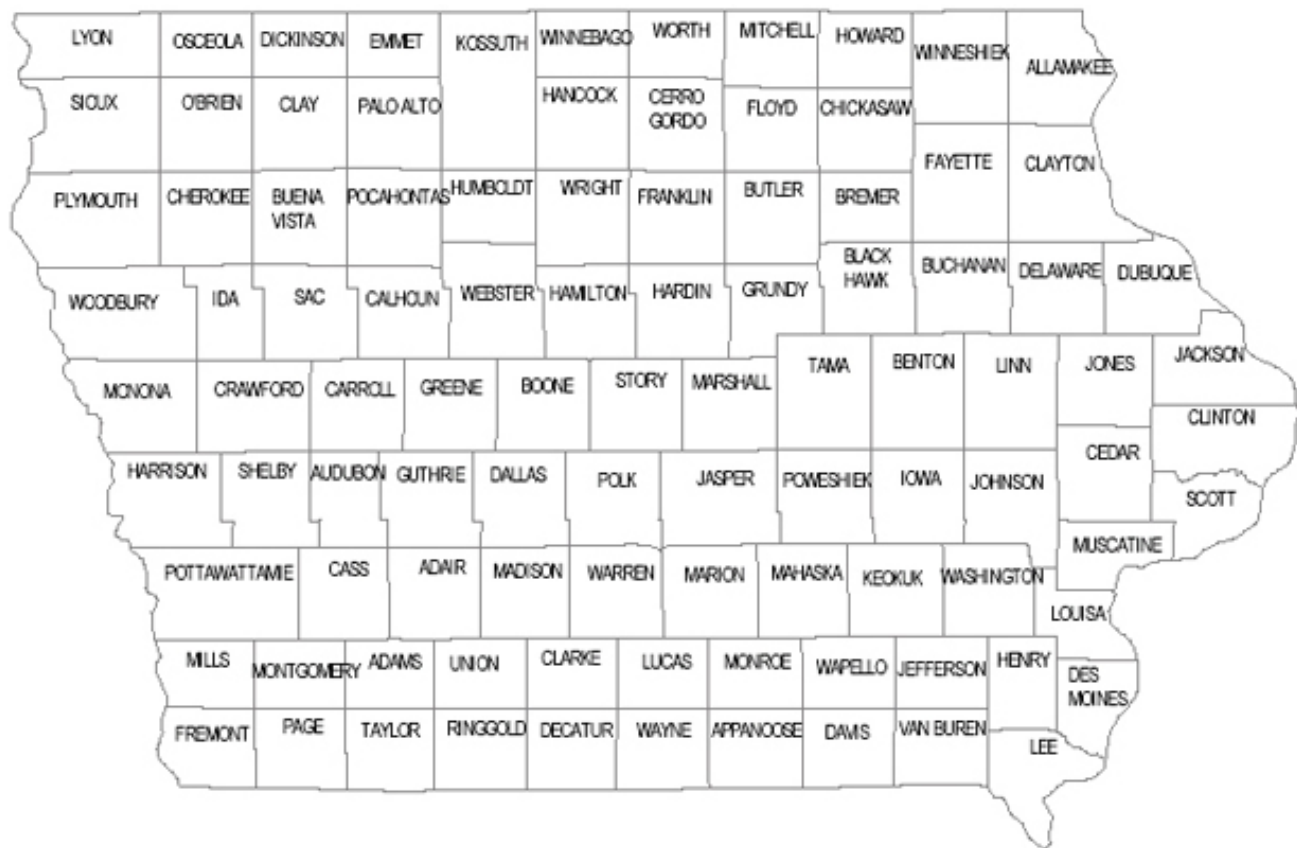
Ask: Do all counties have the same amount of threatened and endangered species? Are the reasons these animals are endangered a problem in just one county or in all counties? Discuss why these counties are so different. How are surveys for these animals performed? Are the surveys on public or private land? What is the land in these counties used for? How does farming and early Iowan settlement affect the surveys? Are the threatened and endangered species more or less wide spread than is listed on the website?

Apply:

Have students list the ways that threatened and endangered species can be protected. Also, how are these animals protected in counties such as Ida County?

Extra Activity:

Fill in the number of threatened or endangered species in each county. When finished compare this map to the Iowa's statewide land use cover inventory map at <http://www.igsb.uiowa.edu/browse/landcvr/landcvr.htm> Are there any correlations between land cover and the number of species listed.



Lesson 4: Invasive Travelers to Iowa

Goals: Students will

- 1) Learn the words exotic and invasive species
- 2) Understand how invasive move and spread
- 3) Know how invasive species can be slowed or prevented

Objectives:

Practice working in groups
Practice creative writing skills

Benchmarks:

Iowa Benchmarks Literacy, 6 – 9: Students can understand stated information they have read.

Iowa Benchmarks Science, 6 – 9: Students can understand concepts and relationships in life. Students can understand life cycles. Students can understand environmental interaction and adaptation.

National Science Standards, 6 – 8: Living things are found almost everywhere in the world. There are somewhat different kinds in different places. In all environments, organisms with similar needs may compete with one another for limited resources, including food, space, water, air, and shelter.

Materials:

- Computer lab or print offs for students
- Pencil and paper

Lesson:

Ask: What are invasive species? How do invasive species get here?

Do:

1) Explain to students what are exotic and invasive plants and animals. Exotic species are plants or animals that were brought from other countries on purpose or accident. Due to this movement species are now away from their original habitat. Some people call exotic species introduced species or non-native species. These exotic animals can be good or possibly harmful to the new habitat or ecosystem. Some examples of exotic animals that are beneficial to us are horses and honey bees. Other exotic plants or animals that are harmful are called invasive species. Many invasive species take over habitats of our native plants and

animals. An example of an invasive species that is harming trees is Emerald Ash Borer.

2) Assign student to work in groups of four or more. Show each group a different Iowa invasive species picture and name from the website <http://www.iowadnr.gov/forestry/invasive.html> and <http://www.iowadnr.gov/forestry/invasive2.html> . Tell the group that half of the student in each group will be reporting on the facts of the invasive and the other half will be making up facts about the invasive species. Give the groups the fact sheets from the website. Explain that the false report needs to be convincing because student will be voting on which stories are true. They will need to use some critical thinking to think of possible ways that the particular species became invasive. Have the pairs of students write one paragraph on the invasive.

3) Have the pairs of students in each group present the information to the class right after each other with a vote on which is true following the reports. Have students take notes on the real facts of the plant or animal.

Reflect:

Ask Students: What are some ways that invasive species spread? What are some ways that we can stop invasive from moving?

Apply:

Have students make a large list together of ways that they can help stop invasive for traveling further from the information that they learned from the presentations.

Extra Activity:

Invasive Species of Iowa



Yellow Starthistle
Autumn Olive
Exotic Bush
Honeysuckles
Cheatgrass
Common Buckthorn
Crown Vetch
Bull Thistle
Canadian Thistle
Chinese Elm
Common Burdock
Dame's Rocket
Garlic Mustard

Japanese -
Honeysuckle
Kudzu
Multiflora Rose
Oriental Bittersweet
Purple Loosestrife
Russian Olive
Spotted Knapweed
Winged Burning Bush
Giant Hogweed
Japanese Knotweed
Leafy Spurge
Muck Thistle

Privets
Reed Canary Grass
Siberian Elm
Tree-of-Heaven
Winged Euonymus
Eurasian Watermilfoil
Emerald Ash Borer

Reading Rangers

The Reading Rangers program offers trees to be planted by DNR foresters in the state forests in exchange for students reading nature-related books and publications. For every 20 pages of a nature related publication that is read during Earth Week (April 19 - 23, 2010), the Forestry Bureau will plant a tree in a state forest. Please fill out the form provided and we will plant the trees and send the class a Reading Rangers certificate of appreciation. Please have all forms sent in by May 21, 2010. Please mail your completed sheets to:

Become a Reading Ranger! Help Iowa's Environment!

School Name & Address: _____

Teacher's Name & Grade Level: _____

Student	Title of Publication	# of Pages Read
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Attach Additional Pages if Necessary

Trees for Kids/ Teens
Iowa DNR - Bureau of Forestry
502 E. 9th
Des Moines, IA 50319

Trees for Kids 2009-2010 – Iowa DNR

Resources

Iowa Department of Natural Resources - Bureau of Forestry

502 E. 9th; Des Moines, IA 50319-0034
515 / 281-5918
<http://www.iowadnr.gov/forestry/index.html>

MidAmerican Energy
www.midamericanenergy.com

Iowa State University - Forestry Extension

Department of Natural Resource Ecology
and Management
339 Science II, Iowa State University;
Ames, Iowa 50011-3221
515 / 294-1168
www.forestry.iastate.edu

Project Learning Tree

Barbara Gigar, Local PLT Coordinator
2473 160th Rd; Guthrie Center, IA 50115
641 / 747-2200
www.plt.org
<http://www.iowadnr.com/education/>

Natural Resources Conservation Service

Find your local office by visiting:
www.ia.nrcs.usda.gov

Black Hills Energy
www.blackhillscorp.com/

Alliant Energy
www.alliantenergy.com

Trees Forever
770 7th Avenue; Marion, IA 52302
319 / 373-0650
www.treesforever.org

Iowa Woodland Owners Association
Carol Fullenkamp
319 / 837-6178
www.iowawoodlandowners.org

Iowa Tree Farm Committee
www.treefarmssystem.org

Iowa Nursery and Landscape Association
PO Box 1647; Waterloo, IA 50704
319 / 215-6855
www.iowanla.org

Iowa Bankers Association
8800 NW 62nd Ave; Johnston, IA 50131
515 / 286-4300
www.iowabankers.com

Iowa One Call
www.iowaonecall.com
1-800-292-8989

Extra Activity:

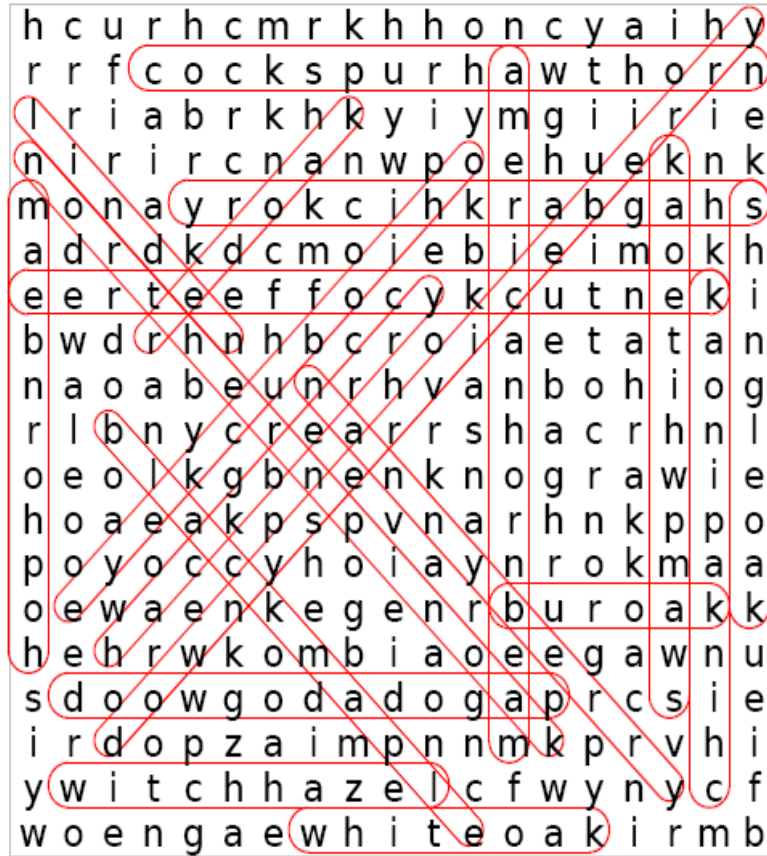
ANSWERS Word Scramble

oonrmsive	<u>o</u> <u>m</u> <u>n</u> <u>i</u> <u>v</u> <u>o</u> <u>r</u> <u>e</u> <u>s</u>
soevbitridyi	<u>b</u> <u>i</u> <u>o</u> <u>d</u> <u>i</u> <u>v</u> <u>e</u> <u>r</u> <u>s</u> <u>i</u> <u>t</u> <u>y</u>
ecgoclalio oofrnpitt	<u>e</u> <u>c</u> <u>o</u> <u>l</u> <u>o</u> <u>g</u> <u>i</u> <u>c</u> <u>a</u> <u>l</u> <u>f</u> <u>o</u> <u>o</u> <u>t</u> <u>p</u> <u>r</u> <u>i</u> <u>n</u> <u>t</u>
rrapimy oecrpruds	<u>p</u> <u>r</u> <u>i</u> <u>m</u> <u>a</u> <u>r</u> <u>y</u> <u>p</u> <u>r</u> <u>o</u> <u>d</u> <u>u</u> <u>c</u> <u>e</u> <u>r</u> <u>s</u>
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ieennecnrttodc	<u>i</u> <u>n</u> <u>r</u> <u>b</u> <u>i</u> <u>v</u> <u>o</u> <u>r</u> <u>e</u> <u>s</u>

Make you own word scramble at <http://www.armoredpenguin.com/wordscramble/>

ANSWERS

20 Native Trees of Iowa



American Hornbeam

Black Maple

Bur Oak

Chinkapin Oak

Cockspur Hawthorn

Downy Serviceberry

Hackberry

Hophornbeam

Kentucky Coffeetree

Linden

Nannyberry

Northern Pin Oak

Ohio Buckeye

Pagoda Dogwood

Red Oak

Shagbark Hickory

Shingle Oak

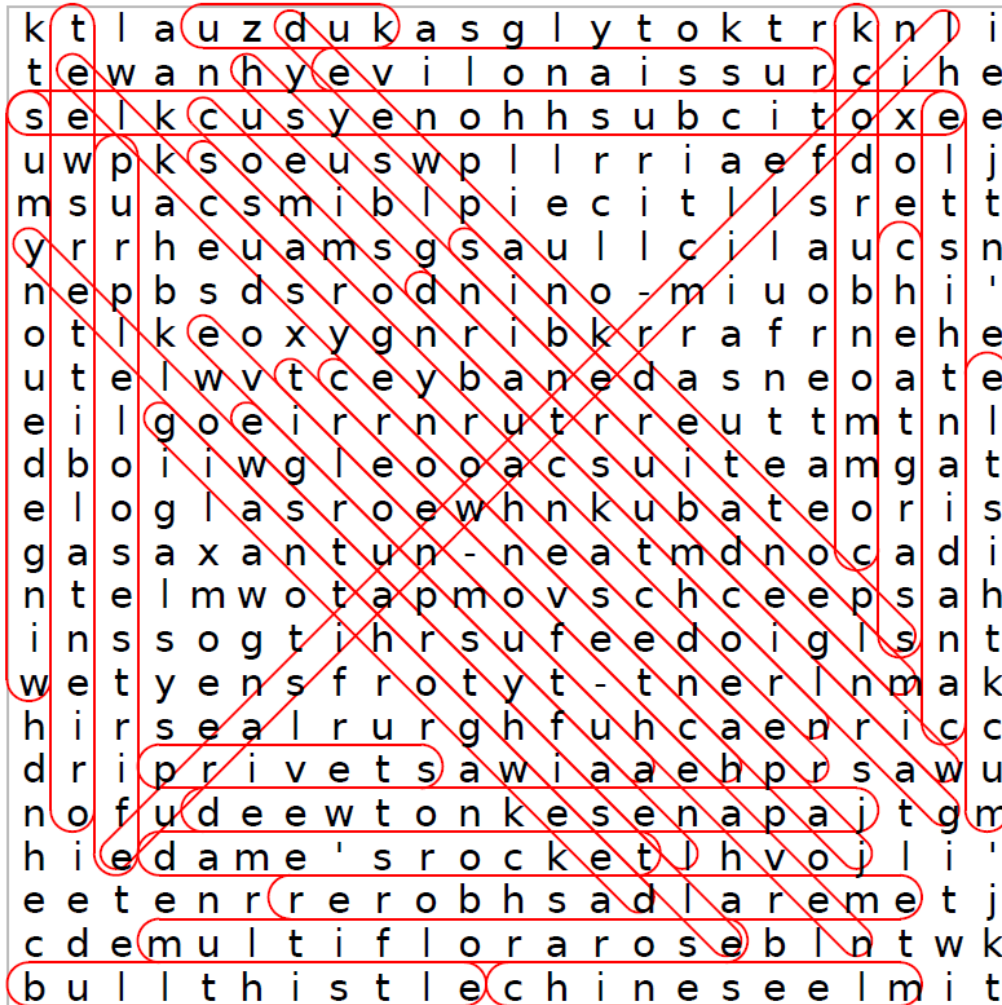
Swamp White Oak

White Oak

Witchhazel

ANSWERS

Invasive Species of Iowa



Yellow Starthistle
Autumn Olive
Exotic Bush
Honeysuckles
Cheatgrass
Common Buckthorn
Crown Vetch
Bull Thistle
Canadian Thistle
Chinese Elm
Common Burdock

Dame's Rocket
Garlic Mustard
Japanese-
Honeysuckle
Kudzu
Multiflora Rose
Oriental Bittersweet
Purple Loosestrife
Russian Olive
Spotted Knapweed
Winged Burning Bush

Giant Hogweed
Japanese Knotweed
Leafy Spurge
Muck Thistle
Privets
Reed Canary Grass
Siberian Elm
Tree-of-Heaven
Winged Euonymus
Eurasian Watermilfoil
Emerald Ash Borer

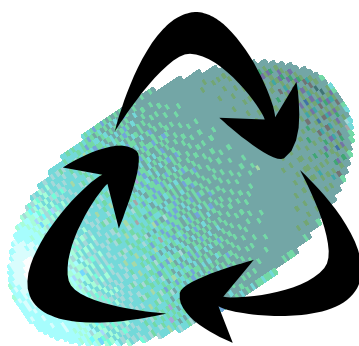
make your own wordsearch at <http://www.armoredpenguin.com/wordsearch/>

Trees for Teens

Ecological Diversity

2009-2010 School Year

Please contact the Trees for Kids / Teens Coordinator at 515 / 281-6749 if you would like a printed copy of these materials or go to the Trees for Kids webpage at:
www.iowadnr.gov/forestry/treesforkids



If you decide to print this booklet, please use recycled paper.

Federal law prohibits employment discrimination on the basis of race, color, age, religion, national origin, sex, or disability. State law prohibits employment discrimination on the basis of race, color, creed, age, sex, sexual orientation, gender identity, national origin, religion, pregnancy, or disability. State law also prohibits public accommodation (such as access to services or physical facilities) discrimination on the basis of race, color, creed, religion, sex, sexual orientation, gender identity, national origin, or disability. If you believe you have discriminated against in any program, activity, or facility as described above, or if you desire further information, please contact the Iowa Civil Rights Commission at 1-800-457-4416, or write to the Iowa DNR at 502 E. 9th; Des Moines, Iowa 50319.



Trees for Kids 2009-2010 – Iowa DNR